PATENT

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: GEORGE B. BYMA et al.	Group Art Unit 1771
Serial No. 10/601,615	Examiner Ula C. Ruddock
Filed: June 23, 2003	
For: VEHICLE INTERIOR TRIM COMPONENT CONTAINING CARBON FIBERS AND METHOD OF MANUFACTURING THE SAME	Confirmation No. 8851
	Attorney Docket 1-73826

Commissioner For Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

DECLARATION OF GEORGE B. BYMA

Honorable Sir:

I, George B. Byma, hereby declare that:

1. I am one of the inventors in the above-identified application. I graduated from Calvin College in 1975 with a Bachelor of Science degree in Chemistry/Biology. I began my professional career in materials in 1977 with Herman Miller, Inc. and continued my materials and engineering work at G&L Industries in interior trim development in 1992. I have been developing vehicle interior trim products at Lear Corporation since 1996. I am currently employed with Lear Corporation, the owner of the above-identified patent application, as the Advanced Sales Manager. I currently work in the areas of product development and marketing, dealing specifically with the development, production, and promotion of vehicle interior products.

2. For many years, laminates for use in vehicular headliners have been formed from glass fibers combined with other materials. Such glass fibers are relatively inexpensive and possess a sufficient amount of strength to make the laminates in which they are used suitable for use in vehicular headliners. As a result, vehicular headliners manufactured from laminates including glass fibers have been well accepted in the vehicular manufacturing industry.

3. There has been and continues to be a long felt need in the vehicular manufacturing industry to reduce the overall weight of vehicles. The motivation for this desire to reduce the overall weight of vehicles has been to improve fuel efficiency in vehicles. Additionally, there has been and continues to be a long felt need in the vehicular manufacturing industry to reduce the amounts of glass fibers that are used in vehicular components. The motivation for this desire to reduce the amounts of glass fibers that are used in vehicular components has been to minimize undesirable issues that can be related to the handling of this material. Thus, in my opinion, there has been and continues to be a long felt need in the vehicular manufacturing industry for an alternative laminate material that is suitable for use in vehicular headliners and that addresses the desires noted above.

4. My invention provides a solution to this long felt need by providing a vehicle headliner that includes (1) a core comprising polyurethane resin foam; and (2) a structural reinforcement layer provided adjacent the core, the structural reinforcement layer comprising a plurality of carbon fibers and a binder for adhering the plurality of carbon fibers to one another thereby forming a mat. My invention also provides a solution to this long felt need by providing a vehicle headliner that includes (1) a core comprising polyurethane resin foam; and (2) a structural reinforcement layer provided adjacent the core, the structural reinforcement layer comprising a plurality of carbon fibers and a plurality of basalt fibers. My invention further provides a solution to this long felt need by providing a laminate that includes (1) a core comprising polyurethane resin foam; (2) a thermosetting resin applied to a side of the core; and (3) carbon fibers adhered to the core by the thermosetting resin. My invention also provides a solution to this long felt need by providing a laminate that includes (1) a

core comprising polyurethane resin foam; and (2) a structural reinforcement layer provided adjacent the core, the structural reinforcement layer comprising fibers with a degradation point above the incineration point of the other materials of the laminate.

5. The carbon fibers, basalt fibers or other fibers of my invention may have a tensile strength higher than the tensile strength of traditional fiber glass. The relative tensile strength of the carbon fibers, basalt fibers or other fibers allows the laminate product to have the desired strength characteristics with a lesser fiber content than a traditional fiberglass laminate product. The use of less fiber to achieve the same desired laminate strength may translate into a lighter weight vehicle headliner. Therefore, the laminate product of the my invention satisfies the long felt need in the vehicular manufacturing industry for a lighter weight vehicle headliner.

6. Additionally, the handling of carbon fibers and basalt fibers does not encounter some of the handling issues that are associated with the handling of glass fibers. As a result, carbon fibers and basalt fibers may be processed in a wide variety of fiber lengths, fiber diameters, and mat configurations that are appropriate for the manufacture of the laminate product. Therefore, the laminate product of my invention satisfies the long felt need for a headliner that is free of glass fiber and is relatively easy to manufacture.

7. Furthermore, there has been and continues to be a long felt need in the vehicular manufacturing industry to recycle automotive parts at the end of their useful lives. The motivation for this desire to recycle automotive parts has been to reduce the amount of waste entering the environment and the costs associated with disposal of the automotive parts. Thus, in my opinion, there has been and continues to be a long felt need in the vehicular manufacturing industry for an alternative laminate material that is better suited for recycling than conventional laminate materials that use glass fibers.

8. The laminate product of my invention addresses this long felt need for a better recyclable laminate. Within the automotive industry, incineration is a desirable method of recycling automotive parts. The laminate product of my invention is readily able to be recycled by incineration. Conventional headliners containing glass fiber are not easily recyclable by incineration because the glass fibers melt during the

incineration process and undesirably coat the interior of the incineration equipment. Coating the incineration equipment with molten glass fiber may damage and/or shorten the life of the incineration equipment. The carbon fibers, basalt fibers or other fibers of my invention will not melt during the incineration process and, therefore, do not coat and/or damage the incineration equipment. Therefore, the laminate product of the present invention satisfies the long felt need for a headliner that is recyclable.

9. The carbon fibers and basalt fibers of my invention have the unexpected benefit of reuse after the incineration of the laminate product. The incineration of the laminate product of the my invention reduces the laminate product to ash and the carbon fibers and/or basalt fibers. The carbon fibers and basalt fibers have a melting point higher than the incineration point of the other composite materials of the laminate product. The characteristics of the carbon fibers and basalt fibers are relatively unchanged by the incineration process. The carbon fibers and/or basalt fibers may be reclaimed from the ash produced by the incineration process and reused in another laminate product suitable for use in a headliner. Therefore, the laminate product has the unexpected property that the carbon fibers and basalt fibers of the laminate product may be reclaimed and reused in another laminate product after the laminate product has been incinerated.

10. I have read and am familiar with the Arthurs reference and the Michael. reference. I understand that the Examiner has asserted that it would have been obvious to one having ordinary skill in the art to have used the Michael reference's carbon fibers and binder in the laminate of the Arthurs reference, motivated by the desire to create a laminate having enhanced lamination strength.

11. To the best of my understanding, the Arthurs reference discloses a laminate that includes a polyurethane foam core layer having glass fiber reinforcement layers bonded to the sides thereof by adhesive. The Arthurs references teaches the use of a grafted polyethylene or grafted polypropylene adhesive to provide the desired strength in a headliner. The Arthurs reference does not disclose that the reinforcing layers comprise carbon fibers. To address this, the Examiner has combined the Arthurs reference with the Michael reference, which discloses an article made from

natural or synthetic fiber 40 and a resinous binder 42. The Michael reference teaches that the fiber 40 may be "a synthetic fiber such as, for example, polyester, glass, carbon, polyolefin, and any polymer." The Michael reference also teaches that a variety of fibers and mixtures thereof may be used in a headliner. I do not believe that either reference teaches the combination of the carbon fibers and binder of the Michael reference in the laminate of the Arthurs reference to create a laminate having enhanced lamination strength as suggested by the Examiner. Therefore, I do not believe that the Arthurs reference and the Michael reference provide any motivation to employ carbon fibers rather than glass fibers in the laminate of the Arthurs reference as proposed by the Examiner.

12. I do not believe that the Arthurs reference and the Michael reference provide any motivation for being combined in the manner proposed by the Examiner. Given the teachings of the Arthurs reference and the Michael reference in regard to enhanced lamination strength, I believe a proper combination of the references would result in the fiberglass and adhesive of the Arthurs reference applied to the door skin of the Michael reference.

13. All statements made herein by me of my own knowledge are true, and all statements made on information and belief are believed by me to be true.

14. I am aware that willful false statements and the like made in connection with my above-identified application are punishable by fine or imprisonment, or both (18 U.S.C. §1001), and may jeopardize the validity of the application or any patent issuing thereon.

Date: 8/7/06

George B. Byma